

REMARKS

In view of the above amendments and the following remarks, reconsideration and further examination are requested.

Claim 21 was rejected under 35 U.S.C. § 101 as being directed to non-statutory subject matter for not reciting that the program is resident on a computer-readable medium. Claim 21 has been amended to recite a computer-readable medium. Accordingly, it is submitted that claim 21 is directed to patent-eligible subject matter under 35 U.S.C. § 101.

Claims 13, 14, and 17 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandler in view of Urbano. Claim 21 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Chandler in view of Urbano and further in view of Manning. These rejections are inapplicable to claims 13, 14, 17, and 21 as amended herein.

Independent Claims 13 and 17 have been amended to recite that the end time predicting unit is operable to predict at least one of an end-diastolic time and an end-systolic time from at least one of an end-diastolic time and an end-systolic time that have been specified by the end-time predicting unit based on times at which the received ECG signal crosses two predetermined points on a reference line and a time at which the ECG signal reaches a negative maximum value. Similarly, claim 21 has been amended to recite an end-time predicting step for predicting at least one of an end-diastolic time and an end-systolic time from at least one of an end-diastolic time and an end-systolic time that have been specified in the end-time predicting step based on times at which the received ECG signal crosses two predetermined points on a reference line and a time at which the ECG signal reaches a negative maximum value. As discussed below, none of the prior art relied on in the claim rejections discloses such a feature, and thus no combination of such prior art would result in the inventions recited in claims 13, 14, 17, and 21.

Chandler discloses a system for determining the time at which an ultrasound is conducted. One aspect of the system of Chandler is a future event prediction in which an interval of an R-wave in an ECG reference signal is tracked and based on an average of recent R-wave intervals, the timing of subsequent R-waves are predicted (see column 3, lines 30-40). An operator positions first and second cursors on a stored physio signal to denote start and end points. The system adds the time separation between the R-wave and the second cursor to the estimated R-wave to determine the estimated times at which the desired trigger event, marked by the second cursor, will occur on each

period of the physio signal in the near future. Thus, Chandler merely discloses using the average interval of an R-wave in an ECG reference signal to predict timing for a trigger event, but does not disclose predicting any event based on times at which the received ECG signal crosses two predetermined points on a reference line and a time at which the ECG signal reaches a negative maximum value as recited in claims 13, 17, and 21.

The secondary reference Urbano was relied on for its discussion of the normal ECG signal shown in Fig. 2. Urbano discloses that the QRS trigger of the ECG signal provides a convenient way to detect the onset of systole and is often used to control ultrasound equipment for capturing image data (see column 4, lines 46-48). Urbano also discloses that the image frames may be acquired from one QRS trigger to the next, or from a few milliseconds after the QRS trigger to a few milliseconds after the next QRS trigger (see column 5, lines 18-21), or at some predetermined time displaced from the QRS trigger (see column 5, lines 36-38, and column 6, lines 26-31). Moreover, Urbano generally discloses that the image frame controller 136 determines predetermined points in time of the heart cycle relative to the QRS trigger and sets the frame rate with respect to the current point in time (see column 17, lines 19-22) and that EKG data may be used to determine the exact location of such points for the current patient (see column 17, lines 44-46). Urbano also discloses an embodiment in which QRS triggers from a plurality of heart cycles are averaged to obtain an average cycle time, and that the time intervals are dynamically adjusted if the heart rate changes. However, Urbano does not disclose predicting any event based on times at which the received ECG signal crosses two predetermined points on a reference line and a time at which the ECG signal reaches a negative maximum value as recited in claims 13, 17, and 21.

Similarly, Manning merely discloses that a synchronization signal to trigger collection of imaging data is generated after each R-wave with a “sufficient delay” for it to mark the expected beginning of diastole (see column 13, lines 45-55). However, Manning does not disclose predicting any event based on times at which the received ECG signal crosses two predetermined points on a reference line and a time at which the ECG signal reaches a negative maximum value as recited in claims 13, 17, and 21.

Accordingly, no combination of the systems of Chandler and Urbano, or of Chandler, Urbano, and Manning would include predicting an end-diastolic time and/or an end-systolic time from an end-diastolic time and/or an end-systolic time that have been specified based on times at

which the received ECG signal crosses two predetermined points on a reference line and a time at which the ECG signal reaches a negative maximum value as recited in claims 13, 17, and 21. Therefore, claims 13, 14, 17, and 21 are allowable over the prior art of record.

In view of the above, it is submitted that the present application is in condition for allowance. The Examiner is invited to contact the undersigned to resolve any remaining issues.

Respectfully submitted,

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